Verification of a Translation

I, the below named translator, hereby declare that:

My name and post office address are as stated below; that I am knowledgeable in the English language and in the German language, and that I believe the English translation of the attached document titled "Method for the production of chemical pulp" is a true and complete translation.

I hereby declare, that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true, and further that all these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statement may jeopardize the validity of any application made thereon.

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Method for the production of chemical pulp

The current invention relates to a method for the production of chemical pulp for further utilization in the production of a fiber web, especially a paper or cardboard web

Chemical pulp is produced in pulp mills through various methods. The raw materials are natural raw materials, such as (predominantly) wood, straw, jute, etc.. Wood for example is cooked in a cooking process and the pulp fibers are leached out and are subjected to quality improvement in further process steps (i.e. bleach, washing, etc.). At the end of the process the pulp is thickened, dried and transported to the paper mills, for example in the form of bales. There, the chemical pulps are again dissolved in pulpers and are prepared for the paper manufacturing process, for example refined and mixed with fillers. This can occur through direct addition of a filler, for example calcium carbonate ($CaCO_3$), or through loading of the surfaces of the chemical pulp fibers with a precipitated additive, for example a filler such as calcium carbonate.

Loading with an additive, for example a filler, may for example occur through a chemical precipitation reaction, especially through a so-called Fiber Loading™" process, as described in addition to other publications, in US-A-5 223 090. In this type of "Fiber Loading™" process at least one additive, especially a filler is deposited onto the moistened fiber surfaces of the fibrous material. The chemical precipitation reaction occurs preferably directly on the fiber surfaces. The fibers may for example be loaded with calcium

carbonate. Calcium oxide and/or calcium hydroxide are added to the moist, disintegrated fibrous material so that at least a part of this associates itself with the water that is contained in the fibrous material. The so treated fibrous material is subsequently treated with carbon dioxide.

When adding the medium containing the calcium oxide and/or the calcium hydroxide to the fiber stock suspension, a chemical reaction with exothermal characteristics occurs. The calcium hydroxide should preferably be added in liquid form (milk of lime). This means that the water that is possibly embedded in or added to the fibrous materials of the fiber stock suspension is not absolutely necessary for the start and development of the chemical reaction.

The objective of the current invention is to cite a method of the type referred to at the beginning that will increase the efficiency of the utilized "Fiber Loading ™" process, as well as the economic efficiency of the raw material supply, especially for paper and cardboard production.

The objective is met by the inventive method for the production of pulp for subsequent use in the production of a fiber web, especially a paper or cardboard web. The manufactured pulp is first loaded with an additive by means of a chemical precipitation reaction. The loaded pulp is then dried and available for subsequent utilization or formulated into a suitable form for shipment.

The inventive combination of the chemical pulp production with the loading process provides improved paper qualities. Since no drying occurs between the pulp production process and the loading process, more calcium hydroxide or calcium oxide can penetrate through the fiber walls, thereby allowing a greater filler content at the inner cell wall

surfaces to be achieved after the precipitation process, and increasing the desired effect through loading. Compared with chemical pulp to which filler (calcium carbonate) was added in the conventional method, the consistencies, optical characteristics, the specific volume ($\frac{cm^3}{g}$) and the porosity, as well as the formation of the produced paper can be increased or improved.

An additional advantage of the inventive method is that the fibers can be loaded centrally, at the pulp mill. Therefore, only one single larger loading station for all the pulp mill customers combined is necessary. In contrast, if the loading process is decentralized, then an individual loading station is required for each customer. Overall, this loading process is less efficient due to cumulative longer downtimes and set-up times.

An additional advantage is found in that the pulp which is loaded with precipitated filler is easier to thicken and accordingly easier to dry. This results in pulp slabs that are produced in the pulp mill for shipment and that generally several times thicker than paper (> 1000 g/m^2) can be dried economically to a much higher level of dry content than previously. Since correspondingly less water needs to be transported, shipping costs are reduced. At the same time considerable energy savings are possible when producing the same shipping dry content.

A further advantage is that due to the combination of the pulp production and the loading processes the strength potential of the fibers, and accordingly the strength of the paper that is subsequently produced in the paper mill can be considerably increased or, that less fiber material is required for a given paper consistency. On the one hand this is attributed to the fact that through the combination of the loading process at the time of the pulp production, considerably more calcium carbonate reaches the inside of the fibers since

the fiber walls are still soaked, thereby facilitating penetration of, for example, milk of lime. On the other hand it is also attributed to that – for a desired filler content in the paper - a portion of the filler is bonded inside the lumen of the fibers. Therefore the fiber bonding points on the outside surface of the fibers are not blocked.

In accordance with an advantageous practical arrangement of the inventive method, the chemical pulp is subjected to bleaching, either after, or in combination with the fiber loading process. At least one bleaching agent such as peroxide, chlorine, oxygen, ozone and/or similar agents can be added to the chemical pulp. Bleaching may also occur in multiple stages with various bleaching agents. It is especially advantageous that the bleaching process can be combined after the "Fiber Loading™" process with the bleaching process that is generally conducted in the pulp mill. This reduces the expenditure for the chemical reagent preparation, as well as the expenditure for waste handling and reprocessing of the waste products accordingly.

According to an advantageous arrangement of the inventive method the chemical pulp possesses a dry content after the drying process that is greater than 80%, especially greater than 85%, advantageously greater than 90% and preferably greater than 95%.

If necessary, the pulp may be refined after the loading process, thereby still further increasing the level of freeness and strength potential.

As already mentioned, the chemical pulp can be loaded, especially with precipitated calcium carbonate.

The pulp production process may for example, comprise cooking of natural fibers.

Advantageously, the pulp is supplied in the form of bales, rolls or similar forms for further use or for shipment.

The inventive method is also applicable with semi-chemical pulp and mechanical pulps (stone ground wood, GMP, brown mechanical pulp, refiner mechanical pulp RMP, thermo-mechanical pulp TMP, CTMP)

The inventive method can be utilized advantageously with chemical pulps that are produced according to the sulfate process and/or according to the sulfite process. In the sulfate pulping process calcium hydroxide is used for the chemical recovery. Here too, a clear synergetic effect is achieved by the inventive combination of the relating process steps.

In addition it is advantageous when considering the economic supply of raw materials, a chemical pulp that was produced according to the inventive process is used in producing a fiber web, especially a paper or cardboard web.

When loading the fibers with, for example a filler, calcium carbonate ($CaCO_3$) is deposited on the moistened fiber surfaces by adding calcium oxide (CaO) and/or calcium hydroxide ($Ca(OH)_2$) to the moist fiber material, whereby at least a part of which can associate itself with the water of the fibrous stock volume. The thereby treated fiber material is then treated with carbon dioxide (CO_2).

The term "moistened fiber surfaces" may encompass all moistened surfaces of the individual fibers. This specifically also includes the scenario where the fibers are loaded with calcium carbonate or any other desired precipitant on their outside surfaces as well as on their inside (Lumen).

According to this the fibers are loaded with the filler calcium carbonate, whereby the loading onto the moistened fiber surfaces occurs through a so-called "Fiber Loading™" process, as described in US-A-5 223 090. In this "Fiber Loading™" process the carbon dioxide with the calcium hydroxide reacts to water and calcium carbonate.

The current invention is further described below with the assistance of an exemplary embodiment and with reference to the drawing.

The only depiction of the drawing shows a purely schematic illustration of the fundamental steps in an exemplary arrangement of the inventive method.

According to this, an initial process step 10 comprises a chemical pulp preparation and production.

The chemical pulp created through this production process is then loaded with an additive, for example a filler in a subsequent process step 12 by means of a chemical precipitation reaction.

Especially calcium oxide and/or calcium hydroxide (slaked lime) is added to the fiber material in such a way that at least a portion of this can associate itself with the water that

is contained in the fiber material, i.e. between the fibers, in the hollow fibers and in their walls, thus creating the following chemical reaction:

$CaO + H_2O$	$\rightarrow$	$Ca(OH)_2$
Slaking of caustic lime		calcium hydroxide

The fiber material is then treated with carbon dioxide (CO_2) in the relevant reactor, so that calcium carbonate ($CaCO_3$) is extensively deposited on the moistened fiber surfaces. This results in the following chemical reaction:

Fiber Loading:	$Ca(OH)_2 + CO_2$	$\rightarrow$	$CaCO_2 + H_2O$
			(Calcium carbonate + water)

Thickening and drying of the pulp (see process step 14) occurs following this fiber loading process.

The loaded, thickened and dried pulp is then prepared for application or for shipment (i.e. bales, roles ...).

Component identification

10 Chemical pulp production process

12 Fiber loading process

14 Thickening, Drying

16 Shipping

Method for the production of chemical pulp

Summary

In a method for the production of chemical pulp for subsequent use in the production of a fiber web, especially a paper or cardboard web the chemical pulp that was produced in a pulp production process is first loaded with an additive by means of a chemical precipitation reaction. The loaded pulp is then dried and available for subsequent utilization or formulated into a suitable form for shipment.

(Figure 1)

Method for the production of chemical pulp

Claims

1. Method for the production of pulp for subsequent use in the production of a fiber web, especially a paper or cardboard web. The manufactured pulp is first loaded with an additive by means of a chemical precipitation reaction. The loaded pulp is then dried and available for subsequent utilization or formulated into a suitable form for shipment.

2. Method in accordance with claim 1,
characterized in that
the chemical pulp is subjected to bleaching , either after, or in combination with the fiber loading process.

3. Method in accordance with claim 2,
characterized in that
at least one bleaching agent such as peroxide, chlorine, oxygen, ozone and/or similar agents are added to the chemical pulp.

4. Method in accordance with claim 2 or 3,
characterized in that
bleaching occurs in several stages, using various bleaching agents.

5. Method in accordance with one of the aforementioned claims,
characterized in that

the chemical pulp possesses a dry content after the drying process that is greater than 80%, especially greater than 85%, advantageously greater than 90% and preferably greater than 95%.

6. Method in accordance with one of the aforementioned claims,
characterized in that
the pulp is refined after the loading process.

7. Method in accordance with one of the aforementioned claims,
characterized in that
the chemical pulp is loaded with precipitated calcium carbonate.

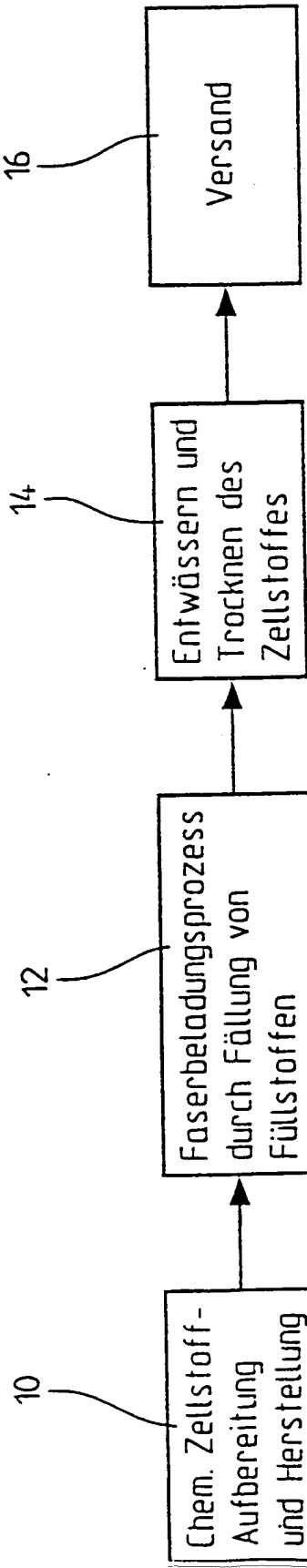
8. Method in accordance with one of the aforementioned claims,
characterized in that
the pulp production process comprises cooking of natural fibers.

9. Method in accordance with one of the aforementioned claims,
characterized in that
the pulp is supplied in the form of bales, rolls or similar forms for further use or for shipment.

10. Application of the method in accordance with one of the aforementioned claims with chemical pulps that are produced according to the sulfate process and/or according to the sulfite process.

11. Utilization of chemical pulp that was produced according to one of the aforementioned claims in the production of a fiber web, especially a paper or cardboard web.

Fig.1


10
Chem. Zellstoff-Aufbereitung und Herstellung
Chemical Pulp Preparation and Production
12
Faserbeladungsprozess durch Fällung von Füllstoffen
Fiber Loading process by means of precipitation of fillers
14
Entwässern und Trocknen des Zellstoffes
Thickening and Drying of the chem. pulp
16
Versand
Shipping